

Dynamics of mercury in eared grebes on the Great Salt Lake

Presentation to the Mercury Work Group
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Funded Study FY'06

- U.S. Fish and Wildlife (UT)
- U.S. Geological Survey, Biological Resources Division, U.C. Davis (CA)
- Joseph R. Jehl

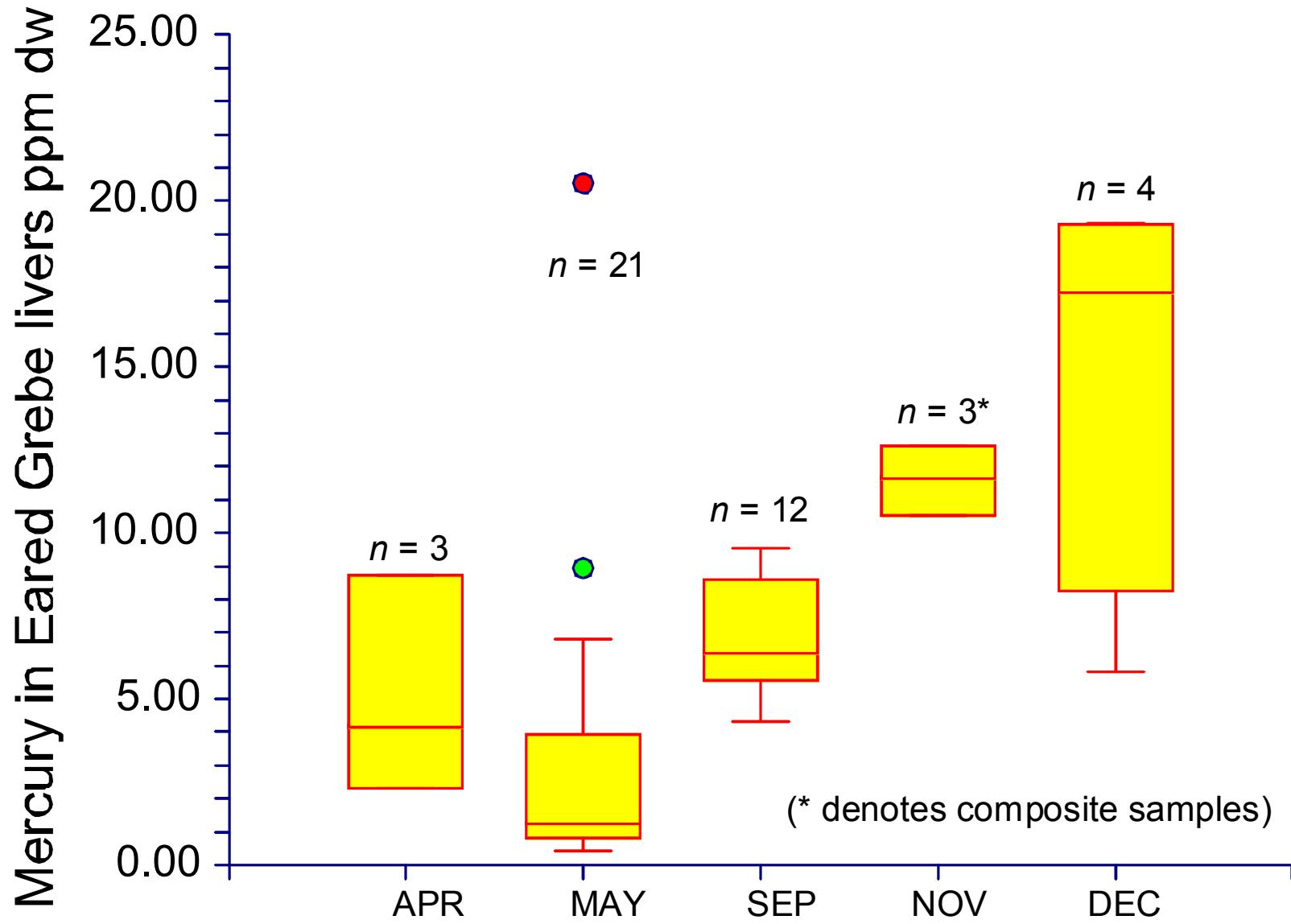
Partners

- U.S. Geological Survey, WRD (UT) (WI)
- Utah Division of Wildlife Resources
- Utah Division of Water Quality

Why *Podiceps nigricollis*?

- Eared grebes spend 3 to 4 months on GSL during fall migration
- They eat brine shrimp almost exclusively
- Previous data suggest Hg accumulation
- “Control” population at Mono Lake, CA
- Archived samples

Previous Hg data from grebe livers



Study Design - Collections

- Eared Grebes (total Hg, some meHg)
 - Livers
 - Breast muscle tissue
 - Feathers (flank)
- Brine Shrimp
- Water (total Hg and total meHg)
- Particulate Matter??

Study Design - Timing

$n = 7$	Spring (Apr)	Early Fall (Oct)	Late Fall (Dec)
Great Salt Lake	2006	2006	2006 2004
Mono Lake			2006 2005
Wyoming		2005	

One-way analysis of variance (ANOVA) (alpha = 0.5 power = 0.97 beta = 0.03)

Study Design - Hypotheses

- **Ho: Hg concentrations do not differ among locations or stage of migration**
- **Ha: Hg concentrations are higher late staging and post staging at GSL than other migration stages or reference location**
- **Ho: Hg concentrations do not differ among similar migration states**
- **Ha: Hg concentrations differ and therefore temporal considerations of Hg concentrations are important**

Study Design - Objectives

- Our objective is to establish credible estimates of mercury accumulation in eared grebes attributable to staging on GSL.
- Concurrent collection of water and invertebrate samples to characterize Hg distribution in the GSL system and in eared grebes will provide information necessary for resource managers to establish bioaccumulation and bioconcentration factors for Hg exposure and risk assessment analyses.

Management Implications

- Does Hg accumulate in birds residing on GSL (waterfowl move around more)
- Is Great Salt Lake different (e.g., than Mono Lake)
- Does feather growth 'protect' grebes
- Bioaccumulation: are species that rely upon the GSL at risk (e.g., Wilson's phalaropes)